**CLAIMS PTO** 

01/22/07

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Claim (Withdrawn): A method for aiding product life cycle planning, comprising: setting product use period and langest part ascful life of product determining product use period \$ 0.5 x longest part methol life, and sear-mines by proposing trace of ports when penduct are period \$ 0.5 x longest part ascful life is satisfied.

Claim 2 (Withdrawn): A method for aiding product life eyele placetry, comprising; generating information descending worth degradability wherein worth defendation of parts eclaims to discard of product and cost rates of parts to a whole product, and extracting, from the information, parts which is impossible to appealer and has highest worth degradability as improvement, object parts.

Claim 3 (Withdrawn): A method for adding product life cycle planning, comprising: generating information recovering use period and oseful life of parts; and extracting, from the information, parts which is impossible to apprade and has sharess use period as amprovement object parts.

Claim 4 (Withdraway: A method for alding product tile cycle planning, comprising: 
'generating information concerning use period and useful life of parts; and 
extracting, from the unformation, parts whose maintenance replacement is impossible 
and whose useful life is should as improvement object parts.

planning, comprising:

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generating information converning was puried and uncful life of parts; and

- oxtracting, from the information, parts whose maintenance replacement is impossible and whome useful life is shortest as improvement object parts.
  - 5. A method for adding product life syste planning, comprising:
  - generating information concerning quat ratio of parts to a whole product and environment load ratio; and

extracting rouse candidate parts from the information.

6. A method according to claim 3, comprising: producing a two-dimensional graph wherein the cost ratio and the environment lead ratio are indirected by 0x68, based on the information; and

dividing the graph into a plurality of domains, and

- 20 said extracting step including extracting the feuse candidate parts from at least one of the domains in which parts are existed.
- 7. A method emorating to claim 5, comprisings generating information concerning cost catho of parts to the whole product and environment load ratio; producing a two-dimensional graph wherein the cost ratio and the environment load ratio are indicated by

axis bared on the information:

assigning each part to one of division donein

obtained by dividing the graph based on a given
threshold; and

extracting a reuse candidate part from a demain in which parts are existed.

Claim 5 (Withdrawn): A method for aiding product life cycle planning competiting generating information contenting a use period of ceuse source product it, a remaining useful life of parts j to be included in the rease source product, a use period of ceuse destination product it, a production period of ceuse source product a and a production period of reuse destination product it; and determining that parts is possible to reuse only in the case where the remaining useful life of parts j to be included in the reuse tource product remains more than the use period of reuse destination product if on on if the use period of reuse source product a re-schipsod, and wheth of parts j collections even if the use period of reuse destination product it is stanted, the production period of rease source product if in stanted, the production period of rease source product i and the use period of reuse destination product if are considered, and the amount of reuse source product i is enough within the production period of reuse destination penduct i based on the information.

Chies 9 (Withdown): An apparator for aiding product life cycle planning, comprising:

- a setting device configured to set product use period and longest purt useful life of product:
- a determination section configured to determine product use period  $\leq 0.5$  x longest gard useful life, and
- a proporting device configured to automaze ally propose reuse of parts when product use period £0.5 x longest part useful life is suisified.

Claim 10 (Withdrawn): An appurates for aiding product life cycle planning, comprising:

A agentrates configured to generate information concerning worth deprodubility wherein worth deterioration of parts relates to distand of product and cost ratio of parts to a whole product, and

se extracting draine configured to extract, them the information, parts which is caposible to upopate and has highest worth degradability as improvement object parts.

Claim 11 (Withdrawn). An apparatus for aiding product life cycle planning, compraing:

a generate recolliqued to general information recording use period and useful life of parts; and

so extracting device configured to extract, From the information, parts which is empiricility to apprade and has shower use period as improvement object parts.

Claim 12 (Withdrawn): An apparatus for aiding product life tyele planning, comprising:

a generator configured to generate information recreaming use period and useful life of parts, and

an extracting desire configured to extract, from the information, party whose productioned replacement is impossible and whose useful-life is shortest as improvement object party.

- An opperatus for siding product life cycle planning, comprising;
  - A generator configured to generate information concerning cost ratio of pares to a whole product and environment load ratio; and
  - an extraction device configured to extract rease condidate parts from the information.
  - 14. An apparates According to claim 13, comprising:
  - a production device configured to produce a two-dimensional graph wherein the cost ratio and the environment load ratio are indicated by axes, based on the information; and
  - a dividing device configured to divide the graph into a plurality of domains, and
- 25 said extraction decine extracting the reuse candidate parts from at least one of the denains in which parts are existed.

15. An epparatus according to claim 13, comprising:

a generating device configured to generating information concerning test ratio of parts to the whole product and environment load ratio:

a producing device configured to produce a two-dimensional graph wherein the cost ratio and the convironment load ratio are indicated by sixes based on the information:

on assigning device configured to assign each park to one of division densin obtained by dividing the graph based on a given threshold, and

an abtracting device configured to extract a rouse condidate part from a domain in which parts are extend

a generater configured to generate information concerning a true period of reuse source product c, a remaining useful life of purs j to be included in the reuse source product, a use period of reuse destination gendant if, a production period of reuse source product i and a production period of reuse destination product it and

means for determining that parts is possible to proceedly in the case where the manufaing useful life of parts j to be imballed in the rease where product remains mean from the use period of rease destination groduct if their superiod of rease source product is starped, and worth of parts j continues even if them has until production of reuse destination product it is started, the production period of tense source product i and the are period of reuse destination product if are tousidered, and the amount of recovery of reuse source product i is enough within the, production period of reuse destination product? based on the information.

Chies 17 (Wathdrawe). A program product for abling product life cycle planning, comprising:

means for instructing a computer to prepare positive use period and longest part useful life of product;

means for instructing the computer to determine product use period  $\le 0.5$  a longest part useful life, and

means for instructing the computer to propose parts must to the new publical when product use period § 0.5 a forgosi part useful title is satisfied.

18. A program product for aiding product life cycle planning comprising;

information concerning cost ratio of parts to a whole product and environment load (Nio)

means for instructing the computer to produce

Claim 16 (Withdrawed). An apparatus for aiding product life cycle planning

Claim 19 (Withdrawn): A program product the siding product life cycle planefing, commission:

means for instructing a computer to generate information concerning a use period of teure source product it, a remaining aveinf late of parts j to be included in the news source product, a tise period of teure destination product if, the production period of reuse source product i and a production period of reuse destination product it and

means for instructing the computer to determine that pants is possible to reuse only in
the case where the remaining, useful life of parts j to be included, in the reuse source product
remains more than the use period of reuse destination product if even if the use period of
reuse source product is selapsed, and weeth of parts j contenues even if time tag until
production of tenue destination product if a started, the production period of reuse source
product i and the use period of reuse destination groduct if are considered, and the amount of
recentry of reuse source product it is enough within the production period of reuse destination
product if based on the information.

Claim 20 (Withdrawn): A program product for adding ground life cycle planning according to claim 19, comprising means the instructing to set the product our period such that a remaining useful life of parts j to be ignified in the reuse housen product converse exception. The are period of reuse distinution product if even if the are paried of reuse source product it is clapsed.

Chim 21 (Withdrawn): A program product for adding product life tyele planning comprising:

means for instructing a computer to prepare information concerning worth degradability wherein worth deterioration of panes actives in discard of product and cost ratio of pares to a whole product;

means for instructing the computer to extract pellowbood cost ratio exceeds threshold and whose worth degradability is highest as improvement object parts; and

means for instructing to propose in repensive appendix wherein cost toda is not more than the short the improvement object parts.

Chain 22 (Withdrawn): A program product for aiding product life cycle planatog comprising:

meins for instructing a computer to prepare information contensing one period of parts and cost ratio of parts to a whole groduct,

means for instituting the computer to extract pany whose cost ratio extracts threshold and whose two period is abortest as improvement object parts; and

means for instructing to propose inexpersive apprade wherein cost ratio is not note than threshold about the improvement object pans.

Claim 23 (Withdrawn): A program product for siding product life syste planning connections:

meant for instructing a computer to prepare information concenting useful life of parts:

ments for instructing the computer to extract parts whose maintenance replacement is impossible and whose could like is shortest as improvement object parts; and

means for instructing the computer to propose assingenance about the improvement object parts.

CMm 24 (Withdrawa): A program product for aiding product life cycle planning comprising:

means for instructing a computer to prepare information concerning use period and useful life of parts;

means for instructing the computer to extract parts where cost ratio executs threshold and whose useful life is stratest as improvement object parts; and

means for associating the computer to geopose inexpensive maintenance wherein cost ratio is not more than threshold about the improvement object teams.

Claim 23 (Withdrawn): A program product for aiding product life cycle planning comprising:

many for exercising a computer to perfore information concerning degratation and abusive vers of parts and corrected of parts of the whole product;

means for estimating the computer to extract parts whose cost ratio exceeds threshold and whose disgradation and abusiveness are largest as improvement object parts; and

means for matricing the computer to propose inexpensive maintenance wherein cost ratio is not more than the should about the improvement object page.



Claim 26 (Currently Amended): A method for siding product bile cycle planning, comprising:

sering a threshold value reneeming tense of puts with respect to coal and emironment.

reading cost of parts and environment lead information from a database;

displaying paris an acrosp displayed on a display design and decided anto a plantality of domains based on the theoribold;

selecting reuse ever) data party from the displayed quety with reference to the displayed map,

calculating a useful (the based condition fromtal expressed as follows:  $\min_{i=1}^{n} 14^{-i}$ ,  $16^{-i}$ ).  $\le 16^{(i)} \cdot \min_{i=1}^{n} 14^{(i)}$ ,  $16^{(i)}$ .

where let's a useful falls time of products; he has a worth life cone of products, he has

determining whether the useful life based condition termina is satisfied,

a useful life time of pair  $\mu$  and  $h^{ej}$  is a worth life time of pair  $\mu$ 

determining possibility of reuse with tempers to the reuse condition parts when the useful has based conduited formula be sanisfied.

calculating a worth life time based condition formula expressed as follows:

direct + min (latt, hall & ball

where  $t_n$  is a since  $\log n$  product it, and  $t^{n'}$  is a production period of product it,  $h^{n'}$  is a worth full time of product it,  $h^{n'}$  is a worth full time of product it, and  $h^{n'}$  is a worth full time of party.

"V determining whether the worth life time based equilition farmula is satisfied; and determining possibility of source with respect to the source constitute parts when the worth life time based condition formula is satisfied.

calculating a recovery quantity based condition (stituda expressed to follow a min  $\{b^{-1},b^{-1}\}< dA^{-1}=03^{2}$ 

where  $0 \le \alpha \le 1$ ,  $12^{\alpha}$  is a useful lifetime of product i,  $i^{\alpha}$  is a worth lifetime of preciser i,  $ti^{\beta}$  is a time  $\log$  of product i, and  $ij^{\alpha}$  is a production period of product i.

determining whether the recovery quantity based etaphilan formula is successed.

[[and]]

determining on a computer possibility of coses with respect to the rease considere parts when the convery quantity based conditions formula is satisfied, and

displaying the determinance, of possibility of rouse with respect to gause of candidge parts.

China 27 (Previously Presented): The method according to a trien 26, wherein the map is disided into four domains a domain where reuse should be actively examined, o domain where reuse should be fairly actively examined, a domain which fails to be suitable for reuse and a domain where reuse is examined.

Claim 28 (Previously Presented) The excited arounding to claim 26, further Alymoung

calculating a wanth life based condition formula for determining that worth of parts j satisfying the useful life based condition formula continues even if time lag and production of reuse destination product f is started, the production period of reuse source product i and the tree period of reuse destination product i are considered.

Claim 29 (Previously Previously The method according to claim 28, wherein the might divided into four domains: a domain where reuse should be actively examined, a domain where reuse should be fairly actively examined, a domain which fails to be suitable for reuse and a domain where reuse according where reuse according to be suitable.

Claim 30 (Previously Presented): An apparatus of oiding product life eyele planning, composing.

an input device configured to set a threshold value concerning reuse of parts with respect to cost and covariances.

a reading decree configured to read cost of parts and encarement total information from a database.

a display decree senfigured to display parts on a map divided errora plurality of domine hand on the threshold,

a selecting device configured to setect reuse Candidate parts from the displayed parts to the relivence to the displayed stage;

a computing device configured to calculate a useful life based condition forms is expressed as follows:

con thit, hit s hat min this, his

where  $\ln^d x$  a useful life time of product  $V_t$  is a worth life time of product  $V_t$  is a worth life time of part  $J_t$  and X' is a worth life time of part  $J_t$ .

a first determining and coaligured to determine whether the useful life based condition formula is satisfied;

a second determining unit configured to determine possibility of reuse with respect to the reuse candidate pure when the useful life based condition formula is satisfied.

the computing device calculates a weath life time based condition formula expressed as follows:

1], "+1P" + man sta", 11" ( # 11"

where the inner lag of product i', and iP' is a production period of product i', the i is a worth-life time of product i', and  $ir^{ij}$  is a worth-life time of product i', and  $ir^{ij}$  is a i with life time of part i.

the first determining weit determinen whicher the worth life time based condition formula of sansfield, and

the second determining usis determines possibility of ecure with respect to the reuse cardidate ours when the worth life time based condition formula is satisfied;

Who computers and selevators a recovery quartity based excell time formula expressed as follows

min ila ', ir' | " iL' + oth'

where  $0 \le n \le 3$ ,  $\ln^2 r_{\rm S} a$  useful life temp of product  $r'_{\rm S}$  is a worth life time of product  $r'_{\rm S}$  it  $L'_{\rm S}$  is a nose lag of product  $r'_{\rm S}$  and  $r''_{\rm S}$  is a production period of product  $r'_{\rm S}$ 

the first desermining unit desermines whether the worth life time based condition formula is satisfied, and

the second determining unit determines possibility of reuse with respect to the coase candidate pairs when the recovery quantity based toordition formulo is satisfied.

Claim 31 Greeiousty Presentest: The apparatus arounding to claim 30, wherein the map is divided into four domains, a domain, where revise should be artively examined, a domain where revise should be fairly actively examined, a domain which fails to be mitable for reuse and a domain where reuse is examined.

V

Chim 32 (Proviously Presented): The apparatus according to claim 30, further comprising.

a computing device configured to calculate a worth life based condition formula for descripting that worth of parts j satisfying the aseful life based condition formula continues even at time log and production of name destination product i' is started, the production period of crosse source product i and the use period of crosse destination product i' are considered.

Claim 13 (Previously Preserved): The apparatus according to claim 12, wherein the user is divided into four domains: a domain where reuse should be serively examined, a domain where reuse should be feitly actively examined, a domain which fails to be suitable for trease and a domain where reuse is examined.

Cairs 14 (Personally Presented): A computer resoluble recording medium containing a computer program to aide product life typic planning, the program computing instructions.

in the state of the content of the parts of the content of the con

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cultubite a useful life bayed confidual terinida esquessed us follows:

con tta", h ") & ta 1- min tta", h")

where  $\mathbf{h}^{A}$  is a useful ( follow of product  $\mathbf{f}_{i}$   $\mathbf{h}^{A}$  is a worth this time of product  $\mathbf{f}_{i}$  to  $\mathbf{h}^{A}$  is a worth tife  $\mathbf{t}$  are of part  $\mathbf{f}_{i}$  and  $\mathbf{h}^{A}$  is a worth tife time of part  $\mathbf{f}_{i}$ .

determine whether the useful life bissed condition formula is satisfied; and determine possibility of same with respect to the reaso candidate parts when the useful life based condition formula is satisfied;

calculate a worth life time based condition funcials expressed as follows.

st." + stP + mic (tal", tr "1 & &"

where the is a time by of product of, and the is a production period of product of half is a worth life time of product of the a worth life time of product of coal half is a worth life time of product of coal half is a worth life time of product.

determine abother the exeful life based condition Consuls is substited;

determine possibility of ecose with respect to the rease randidate guits when the useful life based condition from the is satisfied.

calculate a recovery quantity based condition formula expressed as follows:  $\min\{W^2, S^2\} \approx \pi L^2 + \pi t Y^2$ 

where  $0 \le m \le 1$ ,  $1 \le m \le n$  is a useful life time of product i,  $1 \le m \le n$  would life time of

pendurt i, th' as a time lag of product i', and th' as a production period of product i';

determine whether the worth hife time based condition forms' miscres satisfied; and

determine possibility of trust with respect to the reuse candidate parts when the

recovery quartity based condition formula at satisfied.

Claim 35 (Previously Presented): The program according to Claim 14, wherein the map is divided into five dimining a common where reuse should be wrively extensively.

duman where reuse should be fairly acrively examined, a domain which finis to be sudable for reuse and a domain where russe is examined.

Usin 36 (Previously Presented): The computer readable seconding medium according to claim 34, further competing instructions to calculate a worth life based condition formula for discrimining that worth of parts 3 satisfying the useful life based condition formula continues even if time lag until production of reuse destination product i' is started, the production period of reuse source product i and the use period of reuse destination product i' are considered.

Chies 37 (Provincely Presented). The exceptors residule recording decision according to claim 36, wherein the map is divided 1000 four decision 26 wherein the map is divided 1000 four decision a domain where reuse

should be actively examined, a domain where reuse should be fairly actively examined, a domain whech fails to be suitable for rease and a domain where rease is examined.

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